

Eco-Friendly Extraction of Natural Indicators from Local Plants for Acid-Base Titration

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Abstract: This study explores the eco-friendly extraction of natural pH indicators from locally available plant materials such as rose petals. The extract was tested for effectiveness in acid-base titration and compared with the synthetic indicator phenolphthalein. The natural indicator showed visible color changes and proved to be a viable alternative in rural laboratories where cost-effective and safe chemicals are needed.

Keywords: Natural Indicators, Acid-Base Titration, Rose Petal Extract, Phenolphthalein, Eco-Friendly Chemistry, Rural Labs

I. Introduction

In rural educational setups, the use of synthetic indicators may not always be feasible due to cost or availability. Natural indicators offer an eco-friendly and inexpensive alternative. This study focuses on the extraction of a natural indicator from rose petals and compares its efficiency with the standard indicator phenolphthalein in acid-base titrations.

II. Materials and Methods

Extraction of Natural Indicator

Fresh rose petals were collected, chopped, and soaked in hot water. The solution was heated for 10–15 minutes and filtered to obtain a colored extract.

Titration Procedure

Using standard 0.1 M HCl and 0.1 M NaOH solutions, titrations were performed. Phenolphthalein and the rose extract were used separately as indicators. The volume of NaOH required to neutralize 10 ml of HCl was recorded.

III. Observations

Indicator Used	Volume of NaOH (ml)	Color Change	Accuracy
Phenolphthalein	9.2	Colorless → Pink	High
Rose Petal Extract	9.9	Light Pink → Greenish	Moderate

IV. Results and Discussion

The rose extract displayed a noticeable color transition during titration, albeit with a slightly higher end-point volume than phenolphthalein. While not as precise, the extract is effective for educational purposes and practical chemistry in rural contexts.

V. Conclusion

The rose petal extract is an effective and accessible natural indicator for acid-base titration. It demonstrates moderate accuracy and is a sustainable alternative for use in schools and rural chemistry labs where cost and safety are important considerations.

References

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